repeating said checkings of available second internal links to another first subset of destination output switches with each middle stage switch other than said first middle stage switch.

17. The method of claim 12 further comprising:

setting up each of said multicast connection from its said input switch to its said output switches through not more than two middle switches, selected by said checkings, by fanning out said multicast connection in its said input switch into not more than said two middle stage switches.

18. A method of claim 12 wherein any of said acts of checking and setting up are performed recursively.

19. A method of setting up a multicast connection through a three-stage network, said method comprising:

fanning out only one or two times in an initial stage.

20. The method of claim 19 further comprising:

fanning out any number of times in each of the remaining stages,

wherein said three-stage network includes said remaining stages and said initial stage.

21. The method of claim 19 further comprising:

repeating said acts of fanning out with a plurality of portions of each of said stages.

22. The method of claim 19 further comprising:

recursively performing said act of fanning out.

23. The method of claim 19 wherein:

a remaining stage immediately following said initial stage comprises internal links that are at least two times the total number of inlet links of said initial stage.

24. The method of claim 19 wherein:

said initial stage comprises a plurality of first switches, and a plurality of inlet links connected to each said first switch; and

a remaining stage immediately following said initial stage comprises a plurality of second switches, that are at least double the number of inlet links of each first switch and each second switch comprises a plurality of internal links at least equal in number to the number of first switches in said initial stage.

25. A network comprising:

an input stage comprising N_1 or $n_1 * r_1$ inlet links and r_1 input switches and n_1 inlet links for each of said r_1 input switches, and $N_1 = n_1 * r_1$, said n_1 inlet links for receiving multicast connections;

an output stage comprising N_2 or $n_2 * r_2$ outlet links and r_2 output switches and n_2 outlet links for each of said r_2 output switches, and $N_2 = n_2 * r_2$, said n_2 outlet links for transmitting said received connections; and

a middle stage having m middle switches, and each middle switch comprising at least one link connected to each input switch for a total of at least r_1 first internal links and each middle switch further comprising at least one link connected to at most d output switches for a total of at least d second internal links, wherein $1 \leq d \leq r_2$,

said initial stage having multicast connections with a fan-out of one or two.

26. The network of claim 25 further comprising:

said multicast connections having a fan-out of one or more in said middle stage.

27. The network of claim 25 further comprising:

said multicast connections having a fan-out of one or more in said output stage.

28. A network having a plurality of multicast connections, said network comprising:

an input stage comprising r_1 input switches and n_1 inlet links for each of said r_1 input switches, and $N_1 = n_1 * r_1$;

an output stage comprising r_2 output switches and n_2 outlet links for each of said r_2 output switches, and $N_2 = n_2 * r_2$; and

a middle stage comprising m middle switches, and each middle switch comprising at least one link connected to each input switch for a total of at least r_1 first internal links; each middle switch further comprising at least one link connected to each output switch for a total of at least r_2 second internal links,

wherein each multicast connection from an inlet link passes through at most three middles switches, and said multicast connection further passes to a plurality of outlet links from said at most two middle switches.

29. The network of claim 28, wherein $m \geq 3 * n_1 + n_2 - 1$,

30. The network of claim 29,

further is always capable of setting up said multicast connection by never changing path of an existing multicast connection, and the network is hereinafter "strictly nonblocking network".

31. The network of claim 28 comprising a controller in communication with said input, output and middle stages to set up said multicast connection.

32. The network of claim 29 wherein said r_1 input switches and r_2 output switches are the same number of switches.

33. The network of claim 29 wherein said n_1 inlet links and n_2 outlet links are the same number of links and $n_1 = n_2 = n$, then $m \geq 4 * n - 1$.

34. The strictly nonblocking network of claim 30,

wherein each of said input switches, or each of said output switches, or each of said middle switches further recursively comprise one or more strictly nonblocking networks.